

TC Series

SERVICE MANUAL

Disclaimer

This manual contains instructions for service operations on the ALE TC series printer heads and in systems where it is used. It is intended to be used carefully before performing any manipulation on these.

All service operations should be undertaken by qualified personnel only. Contact us if you need training for our equipment.

All information contained in this Service Manual (as correct at the time of publication) in the version table below, the continual enhancement of our products may result in some differences existing between the information contained in this document and our equipment.

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Version history

Date	Revision	Modifications	Author
03/04/11	1	First version	A5
07/07/11	2	6TC17	A5

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8otes

1 The TC s#stem architecture

The TC series s#stems are ! esigne! to &e connecte! to one of the ALE controllers\$ Each TC consists of a print hea! inclu! ing a print for(ar! print engine\$

Each TC contains h#! raulics an! electronics2

+#! raulics allo(the in" flo(from the reservoir to the print engine

Electronics are use! to transmit the printing !ata from the A series or * aster)eries controller to the print engine, to control the pump an! in the communications &et(een the TC an! the controller Bin" lo(, spit\$\$\$C

The print hea! is enclose! in stainless steel, at least 1,2mm thic"\$

1\$1 9n" circuit

The TC series printing s#stems intro! uce a single reservoir ! esign (ith automatic level control an! pump assiste! priming\$ The &ottle is compati&le (ith the entire range of ALE in" s#stems, containing a valve (hich is automaticall# seale! !uring &ottle removal an! fitting\$

9f a &ottle is fitte! , the reservoir shoul! &e open to air via the *air vent* hole B5ig\$ 1C\$ 5or shipping, this air vent shoul! &e close! Bsee : [\\$2\\$Transport C](#)



5ig\$ 12 %eservoir air vent

Two different schematics describing the TC17, TC 34 and TC 72 ink circuits. The first includes a reservoir, a direct prime module, a pump, an inlet tube and a print engine. The only difference is that the 34mm print engine has two inlets and the 17 and 72mm only one.

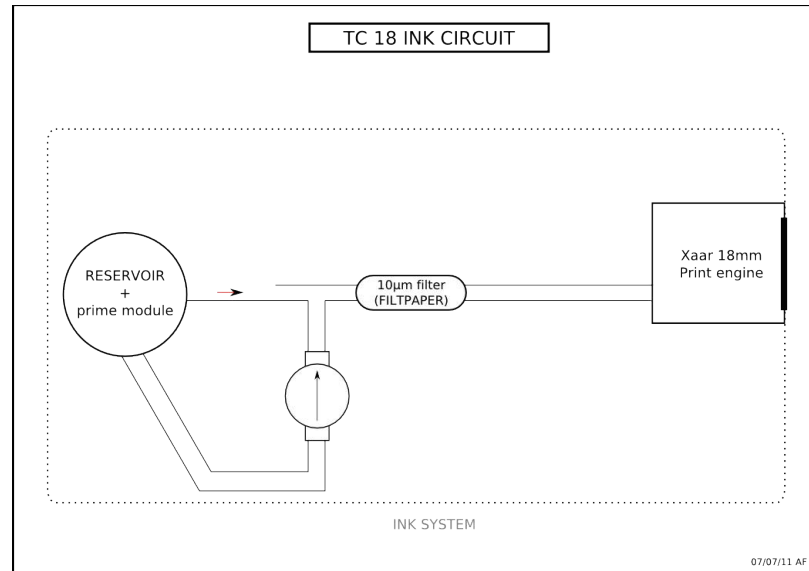


Fig. 22 TC 17 in" circuit

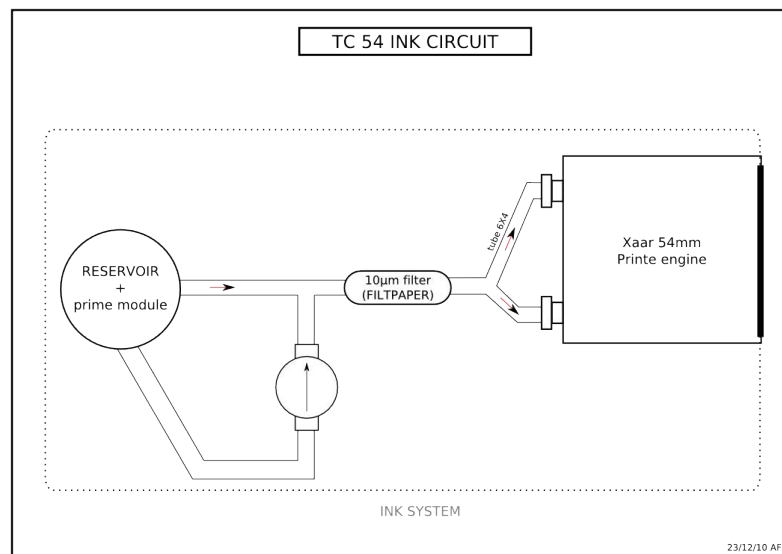


Fig. 2 TC 34 in" circuit

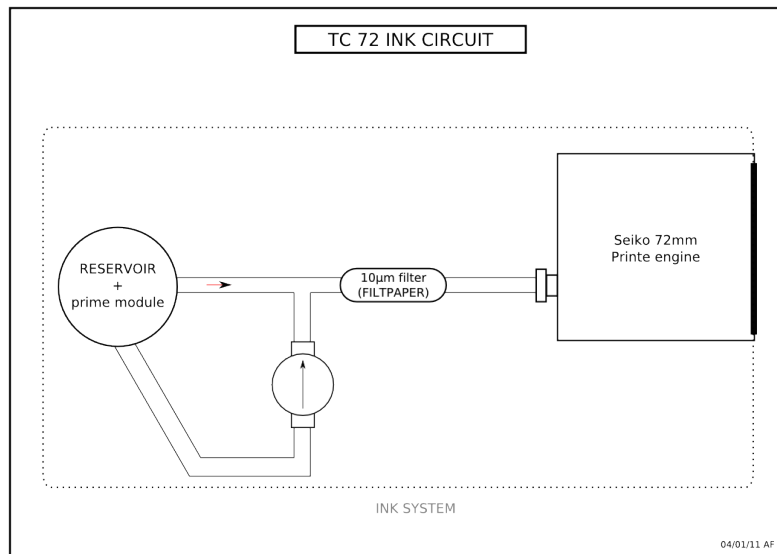


Fig 42 TC 72 in" circuit

Priming mode: the pump sucks ink from the reservoir and sends it to (and) the print engine.

When the pump is active, the ink in the prime module is physically located in the reservoir. The ink cannot go back to the reservoir. When the pump is inactive, the ink goes out of the (and) the ink can pass through the direct prime module.

Printing mode: the print engine takes ink from the reservoir through the direct prime module, through the 1/4 tube, and the filter. The ink is ejected by the print engine nozzle.

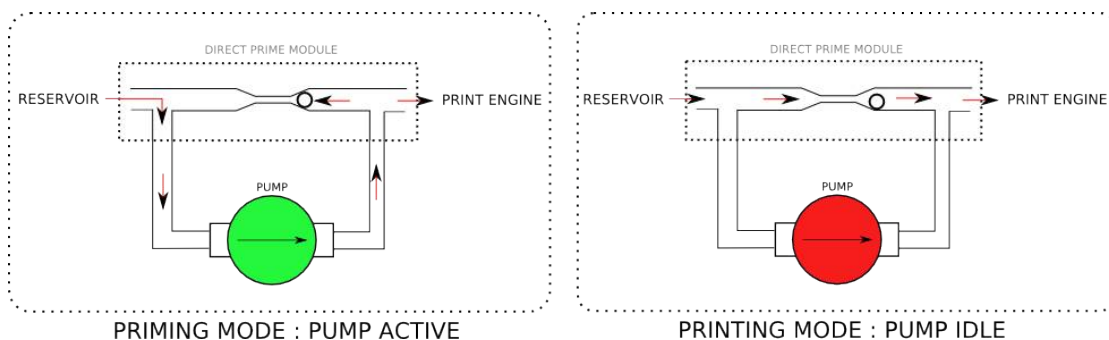


Fig 32 Prime module

1.2 Pump function

The pump only function is to prime the ink circuit. It is not used to refill the reservoir, this is done automatically by gravity.

The pump can operate at two pressure rates.

For normal power priming, use to remove small air bubbles from the circuit or to clean the nozzle plate. The pump is only activated for a few seconds at a time.

For high power priming, use to fill an empty ink circuit.

The pump is connected to the ink line and is activated by the controller using a Pulse Width Modulation (PWM) signal.

1.2: Electronic components of the ink lines

The function of the ink line is the transmission of the data sent by the controller to the relevant equipment. It is involved in all operations of the printing system.

Both TC 17, TC 34 and TC 72 contain a T; D< ink line. The T; D< (which controls the printing, the pump, the ink detection, and the alarm LED).

Additionally, the TC 72 features a specific conversion factor, called γ , as the piezo print engine has a different print height and a different protocol from 34mm piezo print engines.

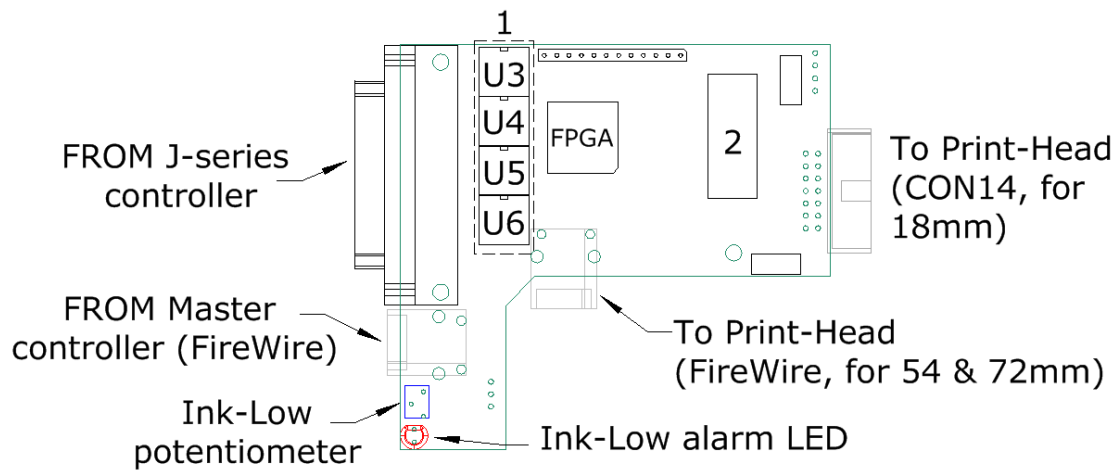
In the near future, those two electronic components will be merged into a single one.

1.2.1: T; D< ink line

The T; D< ink line is located in the print head, next to the pump. It features an IEEE1394 FireWire connector to plug the print engine. The ink detection circuit is integrated on the ink line, and features a potentiometer to adjust its sensitivity.

The MPFA of the T; D< is soldered and does not need to be replaced.

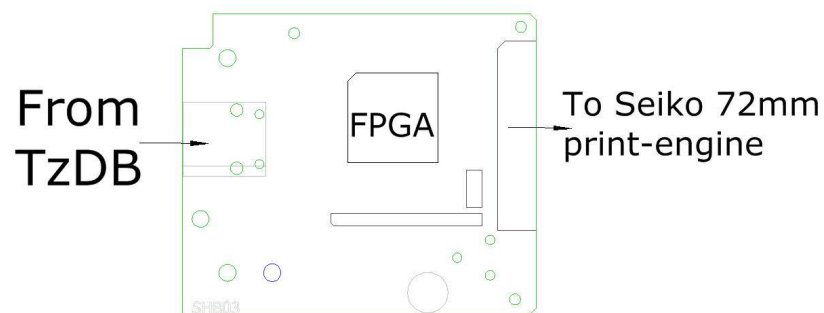
In case of replacement, the reference of the TC 17 and TC 34 is
PC< TGD<\$



5ig\$ =2 TGD< ! river &oar!

1\$: \$2)+< ! river &oar!

The additional ! river &oar! for TC72 is calle!)+< an! is also locate! in the print hea! \$



5ig\$ 72)+< ! river &oar! BTC 72 onl#C

1\$4 Colour co! es an! in" compati&ilit#



DA%8%8F2 8ever change the in" t#pe in a printer an! use onl# ALE
supplie! flui! s bfoun! in our current price listCH * i-ing ! ifferent in"s causes
catastrophic ! amage\$ Components of the h#! raulic circuit can &e ! amage!
&# inappropriate in" or solvent\$

The in" reservoirs an! pumps are co! e! (ith colour tie (raps\$ The pumps are co! e!
(ith a tie (rap aroun! the gear hea! \$

9n" reservoir an! pump colour co! es2

%ED means2 compati&le (ith ALE supplie! solvent &ase! in"s

I ELL>D means2 compati&le (ith ALE supplie! oil &ase! in"s

8>8E means2 compati&le (ith ALE supplie! oil &ase! in"s

>ther in" t#pes2 please contact ALE for further compati&ilit# information\$

2)ervice proce! ures

2\$1 %eplacing the ! river &oar!

2\$1\$1 %eplacement of T; D< ! river &oar!

5ollo(these steps?

) (itch the controller >55

>pen the in" s#stem as ! escri&e! in [2\\$2\\$>pen the printer](#)

Disconnect all connections to the ! river &oar! B5ig\$ 7C2

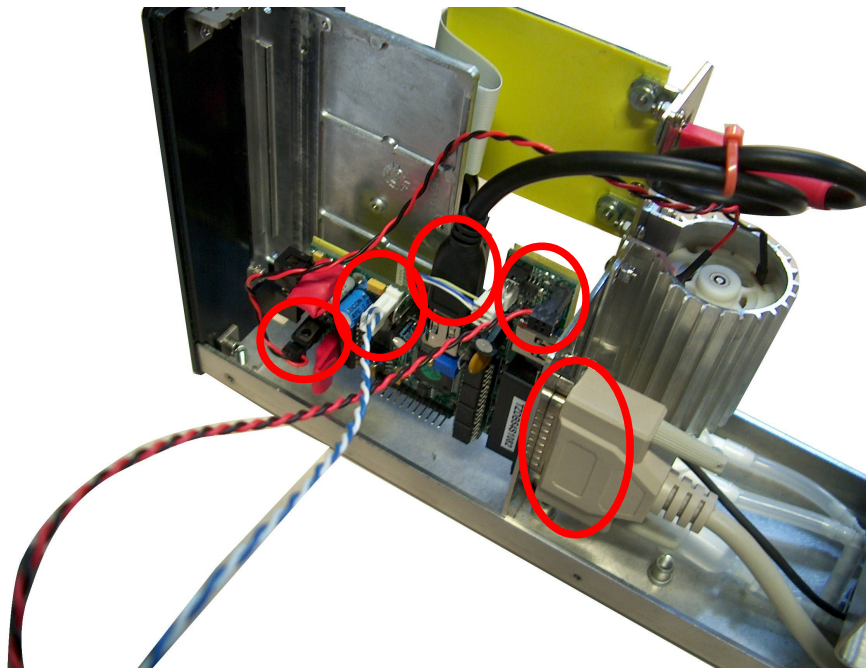
Controller input B23 (a# ri&&on ca&le (ith D connector(or 5ireDire ca&le

Print engine or)+< output B5ireDire ca&le(

Pump B2 (a# plug (ith &lac" J re! (ires(

9n" lo(! etection B: (a# plug (ith &lac", &lue an! (hite (ires(

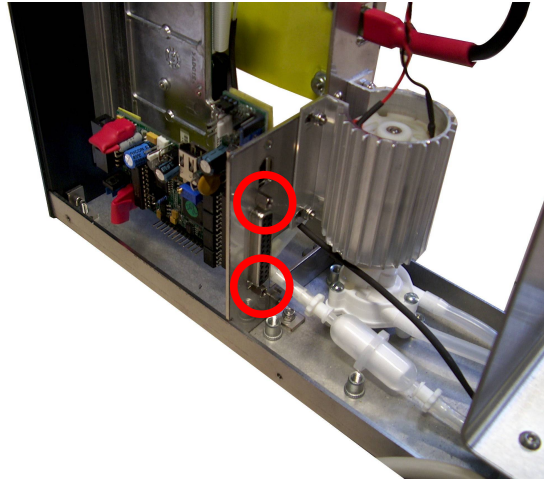
Alarm LED



5ig\$ 72 T; D< unplugging bhere in a TC 720

The ! river &oar! is attache! to the pump plate (ith t(o scre(s2

Kn! o the scre(s B5ig\$ 7C



Unscrew the 2 screws

Put the replacement driver in place

Reassemble the system following the previous steps in reverse order

Replacement of the driver

To replace the driver in a TC 72, follow these steps

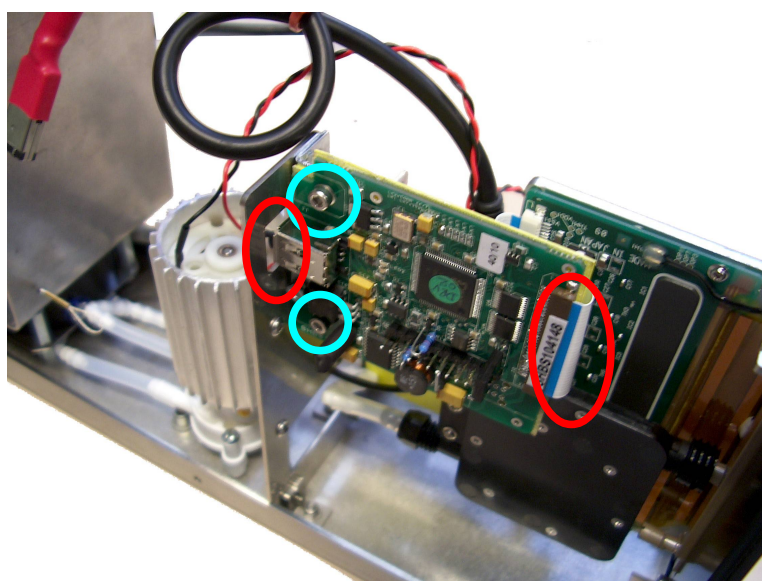
Detach the controller

Open the system as described in [2.2 Open the printer](#)

Disconnect all connections to the driver. Note the order in which the cables are fitted for later refitting.

Print engine output cable

TGD input cable



Disconnect the 2 screws

The driver is attached to the pump plate with 2 screws

Unscrew the 4 screws (blue circles, Fig 10)
Put the replacement driver in place
Reassemble the system following the previous steps in reverse order

2.2 Open the printer

Remove the four screws (green circles, Fig 11)

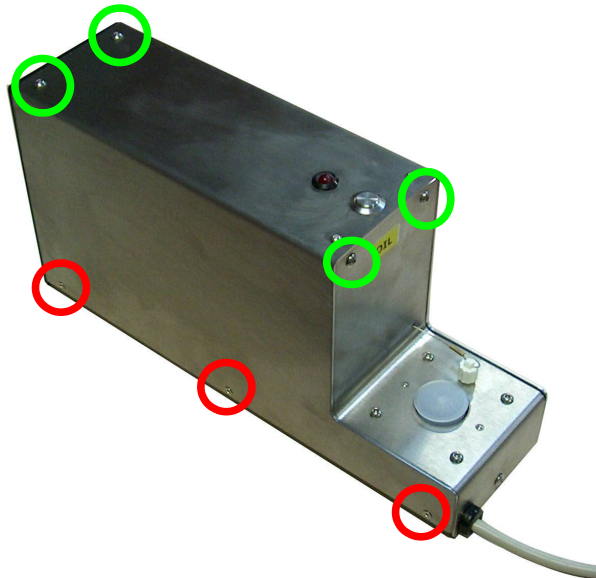


Fig 11 Remove the marked screws

Remove the cover and its connections to the driver

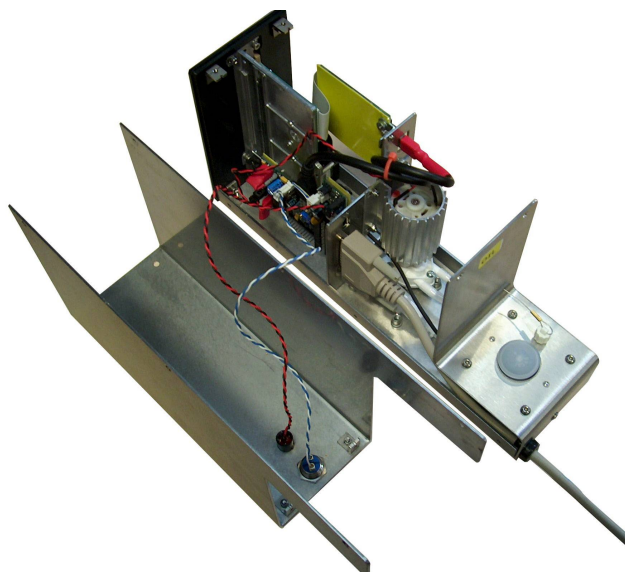


Fig 12 Cover removal

2\$: Access to the in" reservoir

Access to the contents of the in" reservoir is needed for replacing the filter at the bottom of the reservoir

Open the in" system & following the steps given in [2\\$2\\$>open the printer](#)

Unscrew the reservoir cover (Fig 1: C\$ %remove the cover\$ <e careful that a small o ring from the reservoir lid ! doesn't stick" to it (Fig 14C\$

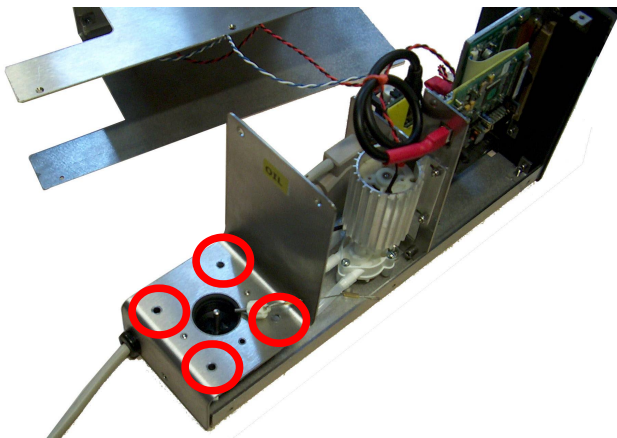


Fig 1: 2 remove * 4 screws from the reservoir cover

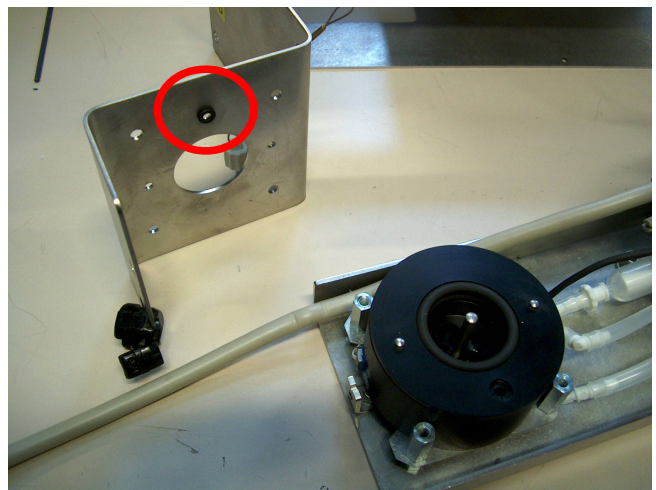


Fig 14: Pay attention to the small O-ring

Once you have access to the contents of the reservoir (Fig 13C\$



Fig 13: remove the lid of the reservoir

2\$4 Changing a print engine

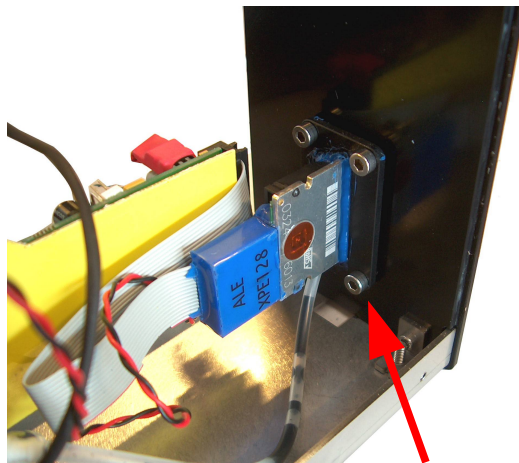
2\$4\$1 Changing the TC17 print engine

5ollo(these steps2

>pen the printer &# follo(ing the instructions given in [2\\$2\\$>pen the printer](#)

Disconnect the print engine connector an! in" tu&e

Knscre(the four * 4 scre(s of the print engine hol! er B5ig\$ 1=C an! remove the assem&l#



5ig\$ 1=2 * 4 scre(s hol! ing the Print engine assem&l#

put the ne(print engine assem&l# in place an! re assem&le the print hea! &# follo(ing the steps in reverse or! er

2\$4\$2 Changing the TC34 print engine

To change the TC34 print engine follo(these steps2

>pen the printer &# follo(ing the instructions given in [2\\$2\\$>pen the printer](#)

Disconnect the print engine connector an! in" tu&e

Unscrew the four screws of the front plate from underneath the printer



Figure 172: Unscrew the front plate from underneath

replace the print engine assembly and reassemble the print head. Follow the steps in reverse order.

2.4: Changing a TC72 print engine

To change the TC72 print engine follow these steps:

open the printer and follow the instructions given in [2.2: Open the printer](#)

Disconnect the print engine connector and insert the

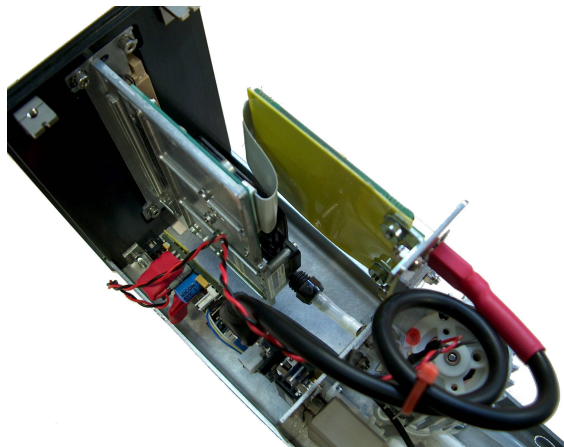


Figure 172: Print engine disconnection

Unscrew the four screws of the front plate from underneath the printer

Unscrew the four screws holding the print engine and extract it

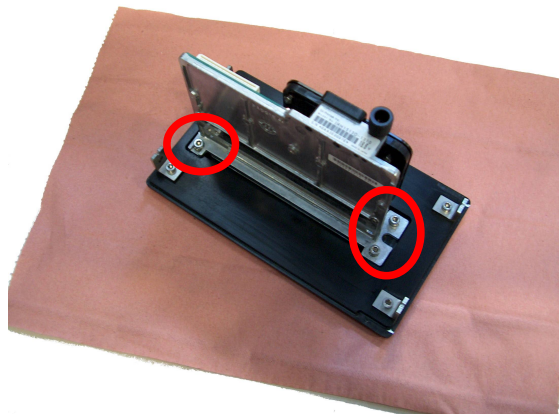


Fig 1.22 print engine removal

Take the O-ring from the around the nozzle plate on the former print engine and put it on the new print engine

re assemble as following the previous steps in reverse order

2.3 Adjusting the ink detection

The ink detection circuit is integrated on the driver board. PC-BT; D₀ ink detection has been specifically adjusted in ALE factory and should not be changed. If there is a risk of running the printer for a long time to have a too frequent ink detection signal on the controller.

Proceed as follows if you still wish to adjust ink detection:

1. Check the controller >55

2. Open the printer as in [2.2 Open the printer](#)

Use a thin hex screwdriver to reach the potentiometer on the T₀; D₀ B5 20 through the pump plate

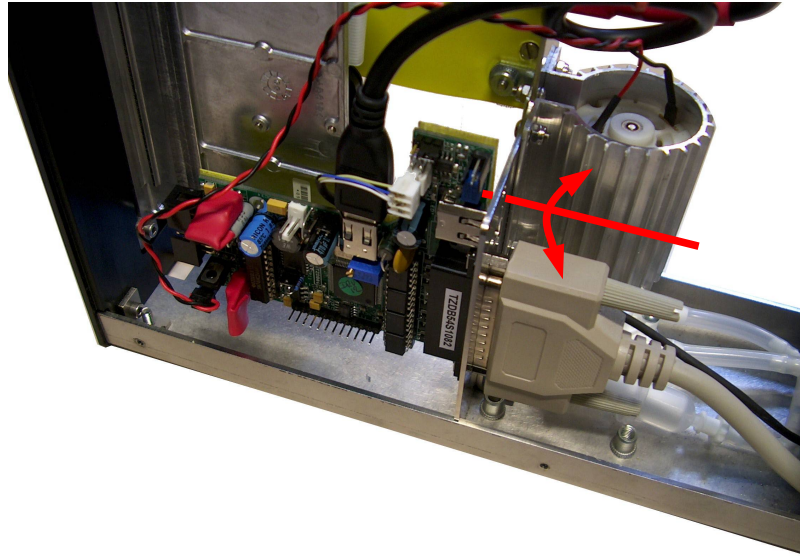


Fig. 202 in" lo(potentiometer adjustment

) (itch the controller >8

Adjust the potentiometer as necessary. Don't forget that in" lo(! etections have a latency#2 in" ta"es a &it of time to ! rip from the ! etection tu&es\$

*** aintenance**

: \$1 Periodic service

You can contact **Ale** for a service "it containing all the necessary filters, o rings and tu&es\$

The following actions should be taken during the periodic service:

>pen the printer &# follo(ing instructions given in [2\\$2\\$>pen the printer](#)

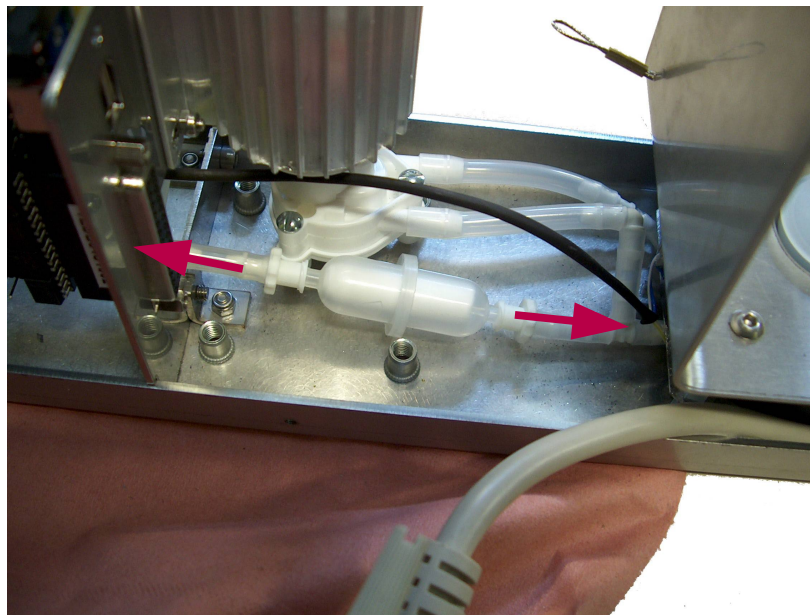
Inspect tubes and fittings for leaks

Clean interior and exterior surfaces

Replace the filter BALE ref 2 59LTPAPE% as follows

Put tissue paper under the filter

Disconnect it on each side



5ig\$ 212 Disconnect the in" filter

```
%replace it (with a new one$ The filter has a flow direction indicate! &# an arrow  
that needs to be respected! $
```

Tighten the conical fittings around the filter, as the ensure the sealing

B5ig\$ 22C

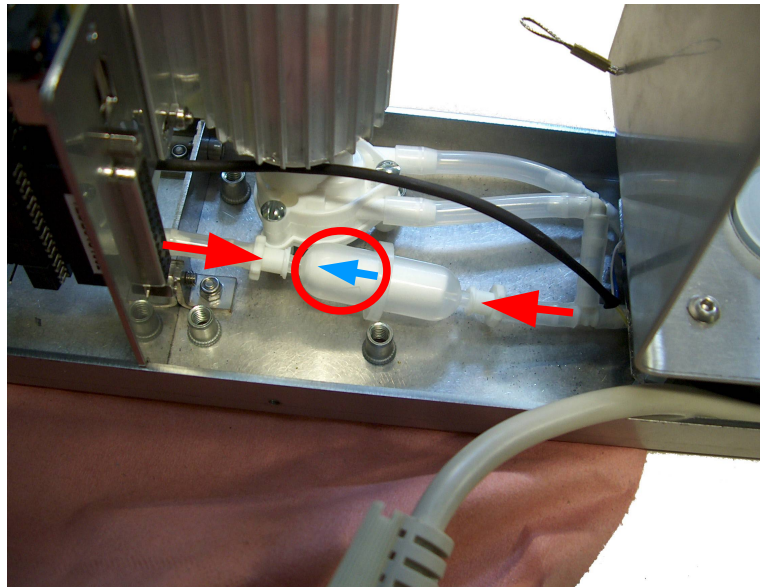


Fig 2.22 mount the new filter in the proper flowing direction, tightly fasten it

Prime the engine and print a label. In the prime menu of the controller, see controller manual for details to make sure all ports are printing

Replace the filter before LTPAGE at the bottom of the reservoir

Empty the reservoir with a syringe. **Do not turn the inlet stem upside down**

Open the reservoir [2. Access to the inlet reservoir](#)

remove the clip holding the filter, replace the filter, put back the clip

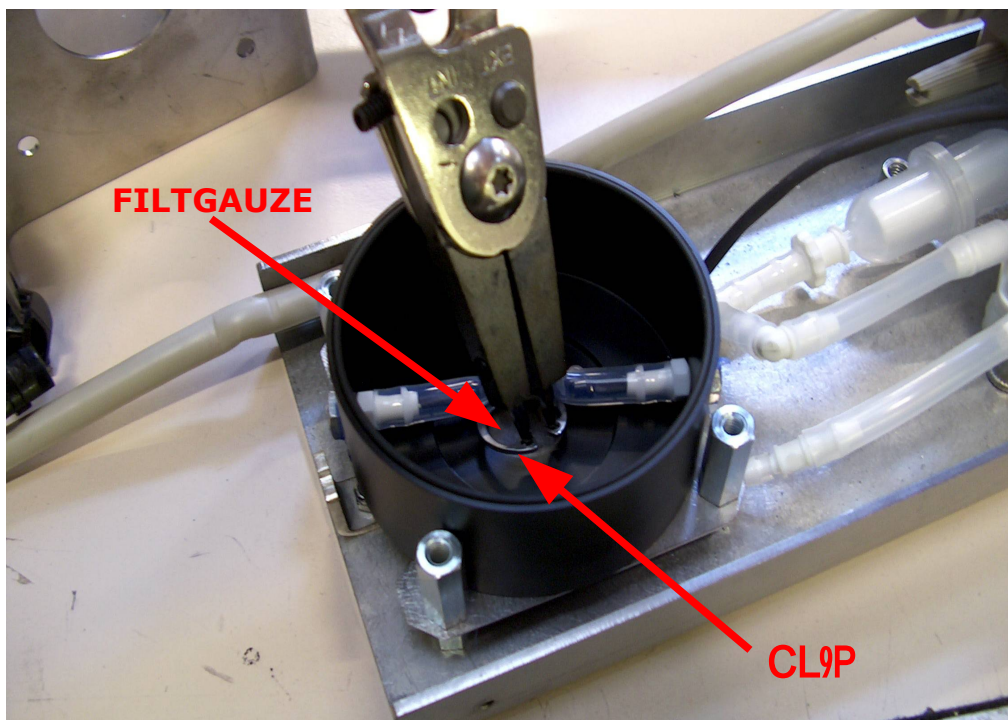


Fig 2.23 Filter replacement

Replace the O-rings of the reservoir if needed. Please contact ALE for dimensions and materials.

Reassemble the entire printer, prime it and check print quality.

: \$2 Transport

: \$2\$1 Empt# the in" circuit

It is necessary to clean and empty the printer before transport. To flush out the printer.

Remove the ink bottle

Detach the controller >8

Put a collecting bucket in front of the printer. Fig. 240

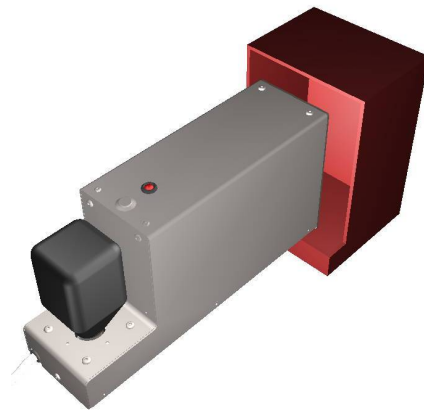


Fig. 242 Ink collection configuration

Use the pump in the controller user manual for details. As many times as necessary to empty the system from ink.

When ink is out, replace the air cap and the reservoir cap on the reservoir.

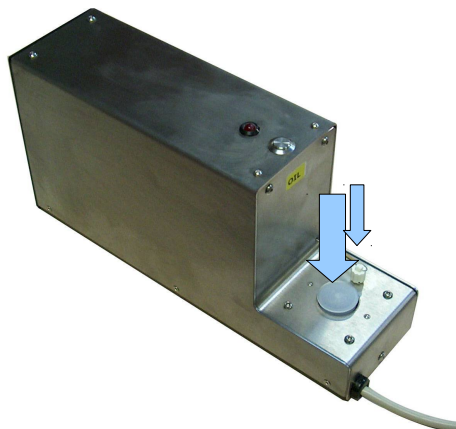


Fig. 232 Replace air & reservoir cap

: \$2\$2 Pack the printer



Pack with care. Make sure the nozzle plate cannot be damaged during transport.

: \$: * **Warning effects of large temperature changes**

Printers are sensitive to the temperature of the environment. The temperature range that is acceptable will depend on the type of ink used in the application.

It is important to establish that the ink is in use (will be appropriate for all seasons of the year).

If the factor is very hot in summer and very cold in winter, the ink may give different print results.

Do not install the system near a window (here direct sunlight can affect it).

4 Fault Diagnosis

Refer to the TC series operators manual for basic fault diagnosis of common printing and priming problems likely to be encountered during installation and use of the system. Listed below is additional information.

After priming, print is OK for a few minutes. Then progressively the primes show horizontal lines appear in the image or print is OK.

Insufficient prime pressure to clear air from the tubes in new systems or in systems that have run dry.

Temporarily use EAETE prime high pressure.

Print heads are being angled. The customer is using priming so air flows back into the engines due to incorrect level.

Print heads should not be moved during priming.

Hook up to printer.

Isolate from source of vibration.

Pump has failed.

Prime (while checking for a good flow of ink from print engine).

Tubes "in" the BA E "in" E occurs (when a tube gets too much).

Prime (while checking for a good flow of ink from print engine).

Bottom valve is not opening properly.

Check bottom valve and replace if necessary.

Bottom of print missing.

See priming?

Prime

Top of print missing on an engine?

See! s priming?

Prime

%an! om ! ots missing?

So; ; les &loc"e! , &# a particle or &# ! r#ing Bsolvent versionC

Purge the print hea! Buse the 0AetP positionC\$ 9f the no; ; les remain &loc"e! ,
contact #our ! istri&utor\$

Engine not printing or e-actl# half of engine not printing?

Loose connection Q chec" ca&les in printer?

%eplace connector if necessar#

So print photocell ! oes not (or"?

Installation uses a shaft enco! er an! line is stationar#?

Line must &e moving for photocell to &e ! etecte! (hen controller set in
shaft enco! er mo! e

<# using the 9/> monitor function on controller, the photocell can &e chec"e!
Bthe ! ispla# 0P00P changes to 0P10P ! uring photocell activationC

Photocell is >M Q pro&lem (ith message R

So print, shaft enco! er ! oes not (or"?

<# using the 9/> monitor function on controller, the enco! er can &e chec"e!
Bthe ! ispla# 0A00P changes rapi! l# to 0A10P, 0A11P, 0A01P ! uring conve#or
movementC

Enco! er (or"ing correctl# Q pro&lem (ith message R

The 9/> monitor sho(s one of the inputs not changing?

5ault# enco! er R Connect ! ifferent enco! er an! spin the (heel &# han! to
see if inputs change

Print start slipping, image misalignment?

Poor contact &et(een shaft enco! er (heel an! conve#or?

%ectif#

Enco! er too far from print hea! s so that conve#or 0stretchP causes pro&lems?

* ove enco! er as close to print hea! s as possi&le

Enco! er mo! e not s(itche! on?

%ectif#

* an# conve#ors vi&rate (hen stationar# causing false pulses to &e sent &#
enco! er\$ Does this occur ! uring photocell ! ela#R

* inimise photocell ! ela#

Photocell ! ela# ' uite long an! s#stem line spee! varia&le\$ The longer the
photocell ! ela#, the more chance for slippage?

* inimize photocell ! ela#

Photocell ! etection unrelia&le2

9nspect photocell\$ Determine a metho! of verification

Photocell ! etection invert! \$ BKse 9/ > monitorC2

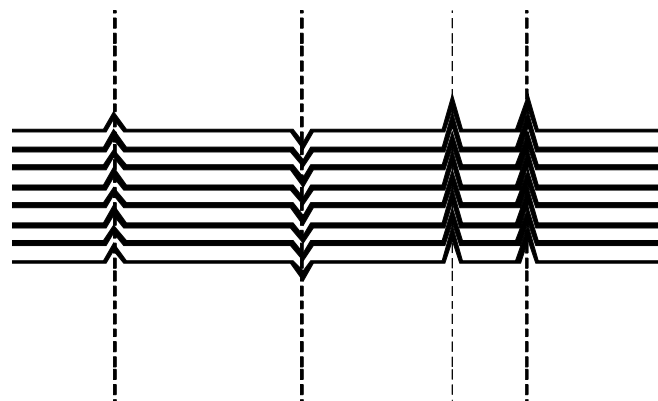
%ectif#

Conve#or speed! e-ceed! ing ma-imum print speed! causing print 0stretchP\$ * a-speed! is appro- 40m/min at 100S print (i! th, 20m/min at 30S an! 70m/min at 200S2

Change (i! th setting or enco! er (heel



5ig\$ 2=2 +ori; ontal print errors ! ue to ! epriming



5ig\$ 272 1ertical print errors ! ue to electronic pro&lem or interference

Lea" from &ottom of the print engine2

<ottle is almost empt# together (ith large temperature changes2

Kse smaller &ottles or fit shipping cap

Pump (ill not prime Bthe soun! of the pump is too highC2

Air lea" in tu&es or fittings2

9f lea" is not o&vious, return for repair

Min"e! tu&e2

9nspect for "in"s in pump tu&e

Direct prime mo! ule is &loc"e! 2

%eplace reservoir

Pump runs continuousl#

PC< is ! amage!

%eplace PC< chip

Pump (ire is shorte! some(here2

%nspect an! repair